Table 1 Soil Sampling Summary

ANALYSIS	METHOD	SAMPLE CONTAINER	PRESERVATIVE	HOLD TIME
Volatile Organic Compounds (VOCs)	EPA 8260 or EPA 5035*	Stainless steel sleeve or 1 x 4 oz. soil jar or Encores	None; Ice, maintained at 0-6°C	7 days preserved; 14 days unpreserved
Total Petroleum Hydrocarbons (TPH) – Gasoline Range Organics (GRO)	Mod. EPA 8260/8015	1 x 4 oz. soil jar	None; Ice, maintained at 0-6°C	14 days
Diesel Range Organics (DRO), and Oil Range Organics (ORO) [no silica gel]	Mod. EPA 8015	1 x 4 oz. soil jar	None; Ice, maintained at 0-6°C	14 days from collection to analysis; 40 days from extraction to analysis
Polycyclic Aromatic hydrocarbons (PAHs)	EPA 8270C SIM	1 x 4 oz. soil jar	None; Ice, maintained at 0-6°C	14 days from collection to analysis; 40 days from extraction to analysis
Metals (CAM17)	EPA 6010/ 7471	1 x 4 oz. soil jar	None; Ice, maintained at 0-6°C	6 months for 6010 28 days for 7471
Fractionated TPH (EPH/VPH)**	MASS DEP EPH/VPH	1 x 4 oz. amber soil jar	None, Ice maintained at 0-6°C	Samples must be extracted within 14 days and extracts analyzed within 40 days of extraction
Synthetic Precipitation Leaching Procedures (SPLP)** SPLP for VOCs, SVOCs, TPH, and metals	EPA 1312	1 X 1L glass jar	None, Ice maintained at 0-6°C	14 days to SPLP, then follow analytical methods

*~50% of samples in Section 1 and 20% of samples in Sections 2-4 will be collected per EPA 5035 i.e Encores

** Method will only be run in Section 4.

Table 2 Water Sampling Summary

ANALYSIS	METHOD	SAMPLE CONTAINER	PRESERVATIVE	HOLD TIME
Volatile Organic Compounds (VOCs)	8260	3 x 40 mL VOA vials	HCl to pH < 2; Ice, maintained at 0-6°C	7 days unpreserved; 14 days preserved
Total Petroleum Hydrocarbons (TPH) – Gasoline Range Organics (GRO)	8260/8015	3 x 40 mL VOA vials	HCl to pH < 2; Ice, maintained at 0-6°C	7 days unpreserved; 14 days preserved
Diesel Range Organics (DRO), and Oil Range Organics (ORO)	8015	1 x 1 L Amber Glass	Ice, maintained at 0-6°C	7 days from collection to extraction; 40 days from extraction to analysis
Polycyclic Aromatic hydrocarbons (PAHs)	8270C SIM	1 x 1 L Amber Glass	Ice, maintained at 0-6°C	7 days from collection to extraction; 40 days from extraction to analysis
Metals (CAM 17)	6010/7471 (field filtered with	1 x 250 mL Poly	HNO_3, maintained at 0-6°C	6 months for 6010 28 days for 7471

	0.45 micron filter)			
Fractionated TPH (EPH/VPH)*	MASS DEP EPH/VPH	2 X 1L Amber glass	HCl to pH < 2; Ice, maintained at 0-6°C	14 days to extraction; 40 days from extraction to analysis

*Method will only be run in Section 4 near the Bluff

7.0 SECTION 1: RELEASE SITE SAMPLING PLAN

The sampling plan for this Section focuses on the visually discolored soil at the west end of the pipeline repair excavation, the sidewall of the Berm located adjacent to and south of the pipeline repair excavation (Berm), and areas adjacent to the inlet culvert.

The west end of the excavation and the Berm will be sampled at the same frequency as outlined in the June 3, 2015, *Confirmation Soil Sampling and Analysis Plan For Refugio incident – Pipeline Excavation Area*.

Sampling for the Inlet Culvert in Section 1 is a follows:

- One five point composite soil sample will be collected from the areas immediately adjacent to the inlet culvert (Attachment A – Feature A).
- A minimum of 2-inches of soil will be removed before collecting soil samples from 0 to 6-inches below the surface being sampled.

7.1 SECTION 1 SAMPLING SCHEDULE

It is anticipated that the soil samples in Section 1 will be collected in one day once the sampling area has been visually inspected, all impacts have been removed to the extent practical, the area is safe to sample, and sampling commences in Section 1 barring any weather, safety concerns, or operational delays. Soil samples will be collected once, unless results indicate additional cleaning/excavation is required or otherwise instructed by UC or other local regulatory agencies.

7.2 SECTION 1 ANALYTICAL METHODS

Soil samples will be analyzed under rapid turnaround (typically within 24-hrs). See **Table 1** for soil sample methods.

8.0 SECTION 2: DRAINAGE PIPE SAMPLING PLAN

The sampling plan for the surface features in Section 2, including the drainage conduit outlet from Section 1 that terminates in Section 2, is as follows:

8.1 CONCRETE DRAINAGE COLLECTION AREA

For details about the concrete drainage collection area, refer to Attachment A – Feature B.

- Up to four discrete grab soil samples will be collected immediately surrounding the collection basin in an area that was not impacted by the release.
- A minimum of 2-inches of soil will be removed before collecting soil samples from 0 to 6-inches below the surface being sampled.

The above samples will be collected from soil outside the drainage collection area that was not impacted by the release. These samples are being collected to establish baseline soil concentrations of any contaminants of concern unrelated to the Refugio Incident that may be released to stormwater runoff from the area immediately surrounding the collection basin.

8.2 DRAINAGE PIPE DROP INLET

- Three discrete grab soil samples will be collected adjacent to the drainage drop inlet (see Attachment A – Feature C).
- A minimum of 2-inches of soil will be removed before collecting soil samples from 0 to 6-inches below the surface being sampled.

8.3 SECTION 2 SAMPLING SCHEDULE

It is anticipated that the soil samples in Section 2 will be collected in one day once the sampling area has been visually inspected, all impacts have been removed to the extent practical, the area is safe to sample, and sampling commences in Section 2 barring any weather, safety concerns, or operational delays. Soil and water samples will be collected once, unless results indicate additional cleaning/excavation is required or otherwise instructed by UC or other local regulatory agencies.

8.4 SECTION 2 ANALYTICAL METHODS

Soil samples will be analyzed under rapid turnaround (typically within 24-hrs). See **Table 1** for soil sample methods and **Table 2** for water sample methods.

9.0 SECTION 3: CULVERT SAMPLING PLAN

Sampling of the Section 3 Culvert will consist of the following:

- One five point composite sample will be collected from the area surrounding and within the wooden wing wall of the culvert (refer to Attachment A – Feature D).
- A minimum of 2-inches of soil will be removed before collecting soil samples from 0 to 6-inches below the surface being sampled.

9.1 SECTION 3 SAMPLING SCHEDULE

It is anticipated that the soil samples in Section 3 will be collected in one day once the sampling area has been visually inspected, all impacts have been removed to the extent practical, the area is safe to sample, and sampling commences in Section 3 barring any weather, safety concerns, or operational delays. Soil and water samples will be collected once, unless results indicate additional cleaning/excavation is required or otherwise instructed by UC or other local regulatory agencies.

9.2 SECTION 3 ANALYTICAL METHODS

Soil samples will be analyzed under rapid turnaround (typically within 24-hrs). See **Table 1** for soil sample methods and **Table 2** for water sample methods.

10.0 SECTION 4: BLUFF SAMPLING PLAN

The sampling plan for the surface features in Section 4 is outlined in the Sections below. Samples collected as described in Section 4 will be used to conduct a human health risk assessment and an ecological risk assessment. The risk assessments will be used to evaluate the risks from exposures to site-specific constituents detected within the Bluff area. Site-specific cleanup goals for constituents identified as chemicals of concern will be derived as part of the risk assessments.

10.1 BLUFF

Soil samples will be collected using a transect system. From the culvert to the edge of the bluff (approximately 200 feet), transects will trend east and west at 25 foot intervals to encompass the remediation area (see Attachment A for a map of transects). Each transect will vary in length depending on the extent of impact and remedial excavation. No sampling will occur outside of the remediated area (except for background samples as outlined in Section 11 of this document). At a minimum, each transect will consist of the following samples:

10.2 SIDEWALLS

- One discrete grab sample will be collected where a sidewall measures less than 3 feet (vertical)
- Two discrete grab samples will be collected where a sidewall measures 3 feet to 9 feet (vertical)
- Three discrete grab samples will be collected where a sidewall measures greater than 9 feet (vertical)

10.3 EXCAVATION BASE

At a minimum, two soil samples will be collected at the base of each transect with one sample targeting the most visually impacted material and/or highest PID readings. Additional soil samples may be collected based on the width of the excavation (target sampling frequency is one sample per 20 linear feet along the transect). A minimum of 2-inches of soil will be removed before collecting soil samples from 0 to 6-inches below the surface being sampled.

10.4 CLIFF FACE

Several constraints exist with the Cliff Face, as established by the June 6, 2015, UC approved Plan, *Constraints Assessment Team (CAT) Activities Related to Cleaning of Cliff Faces and Contiguous Rocky Prominences*. Because of the constraints, no confirmation samples will be collected from the Cliff Face under this plan. An additional plan may be developed to address the Cliff Face.

10.5 SECTION 4 SAMPLING SCHEDULE

It is anticipated that the soil samples in Section 4 will be collected in four to five days once the sampling area has been visually inspected, all impacts have been removed to the extent practical, the area is safe to sample, and sampling commences in Section 4 barring any weather, safety concerns, or operational delays. Soil samples will be collected once, unless results indicate additional cleaning/excavation is required or otherwise instructed by UC or other local regulatory agencies.

10.6 SECTION 4 ANALYTICAL METHODS

Soil samples will be analyzed under rapid turnaround (typically within 24-hrs). See **Table 1** for soil sample methods.

11.0 WATER SAMPLING FOR SECTIONS 2-4

The purpose of the water sampling in Section 2-4 is to have quantitative data to confirm that the culverts that were impacted by the release have been adequately cleaned. Flush water will be brought in by truck or other

means and will be introduced to the inlet of each culvert section and one sample will be collected at the outlet of each culvert. Prior to flushing, one sample will be collected from the water source (i.e. water truck) to be used as a baseline. Water will be field filtered using a 0.45 micron filter and contained and recovered as it exits the final outlet (see Attachment A - Feature E). Two water samples (approximate first flush and middle flush) will be collected from each of the following locations (see Attachment A):

- Section 2 – Feature B
- Section 2 – Feature C
- Section 3 – Feature D
- Section 4 – Feature E

Water samples collected from the above locations will be analyzed according to the methods outlined in **Table 2**. And will be analyzed under rapid turnaround (typically 24 hours). It is anticipated that the above samples will be collected in one day when flushing commences barring any weather, safety concerns, or operational delays.

12.0 BACKGROUND SAMPLING AND ANALYSIS

Background samples, as they pertain to this Addendum, will only be collected from Section 4 (Bluff). Background samples will be collected from five locations located approximately 150 feet east and five locations located approximately 150 feet west of the impacted area along the Bluff, with similar basic characteristics as the drainage path of the release. These locations will not have been affected by activities on the site and will be at least 50 feet from the tracks.

Two discrete samples will be collected at each of the ten background locations. One sample will be collected from the upper organic layer of soil. A second sample will be collected from the same boring at a depth of approximately 3 feet. Due to the lithology (terrace deposits) and topography of the Bluff, sample collection at 3 feet may not be feasible. A total of 20 background samples will be collected.

12.1 BACKGROUND SAMPLING ANALYTICAL METHODS

Soil samples will be analyzed under rapid turnaround (typically within 24-hrs). See **Table 1** for soil sample methods.

13.0 BACKFILL SAMPLING AND ANALYSIS

In addition to confirmation soil samples and background soil samples, samples will also be collected from any soil that is intended to be used as backfill. Certified clean backfill for this site will be imported from an offsite source. The backfill material obtained for the Bluff will be similar to existing soils of the Bluff area. In order to certify the backfill does not contain hydrocarbon or other compounds, the backfill source will be sampled and analyzed as described below. Backfill source soils will be sampled based on the volume frequency prescribed in the Department of Toxic Substance Control (DTSC) guidance for sensitive land use properties, as outlined in the UC approved Plan, *Confirmation Soil Sampling and Analysis Plan For Refugio incident – Pipeline Excavation Area.*

14.0 SCREENING LEVELS

The cleanup endpoints for soil outlined in the Unified Command-approved *Refugio Incident Response Phase II Guidelines for Terrestrial, Marine Waters, and Shoreline Habitat Cleanup Endpoints* consist of health-protective Environmental Screening Levels (ESLs) published by the San Francisco Bay Regional Water Quality Control Board (SFBRWQCB) for all Chemicals of Concern (COCs) with the exception of Total Petroleum Hydrocarbons (TPH). According to the SFBRWQCB, the presence of a chemical in soil at concentrations below the corresponding ESL can be assumed to not pose a significant threat to human health, water resources, or the environment. The presence of a chemical at concentrations in excess of an ESL does not necessarily indicate adverse effects on human health, or the environment, rather that additional evaluation is warranted.

The CCRWQCB and SBCEHS have determined that the following screening levels are acceptable for Sections 1-3:

- The SFBRWQCB Commercial/Industrial Land Use Tier 1 Environmental Screening Levels for Shallow Soil with Groundwater a Current Source of Drinking Water. A complete list of these screening levels is available online at http://www.waterboards.ca.gov/sanfranciscobay/water_issues/programs/esl.shtml
- Total Petroleum Hydrocarbons (TPH)
    - TPH-Gasoline Range Organics (TPH-GRO) = 500 mg/kg
    - TPH-Diesel Range Organics (TPH-DRO) = 500 mg/kg[1]
    - TPH-Motor Oil Range Organics (TPH-MORO) = 500 mg/kg

A list of soil screening levels for Sections 1-3 are provided in **Table 3**.

[1] 500 mg/kg TPH-DRO soil screening level departs from the SFBRWQCB's ESL; the 500 mg/kg TPH-DRO soil screening level was determined appropriate by the CCRWQCB and SBCEHS.

The cleanup endpoints for the Bluff in Section 4 will be determined though a human health and ecological risk assessment. Cleanup endpoints for the Bluff developed though the risk assessments will be protective of both human health, wildlife, and the marine environment.

Table 3 Environmental Screening Levels for Soils in Section 1-3[1]

Analyte	Soil Screening Level (mg/kg)[1]	Laboratory Method Detection Limit (mg/kg)[2]
1,1,1,2-Tetrachloroethane	0.0091	0.0012
1,1,1-Trichloroethane	7.8	0.0032
1,1,2,2-Tetrachloroethane	0.018	0.0011
1,1,2-Trichloroethane	0.07	0.0012
1,1-Dichloroethane	0.2	0.0015
1,1-Dichloroethene	1	0.0029
1,2,4-Trichlorobenzene	1.5	0.00099
1,2-Dibromo-3-chloropropane	0.0045	0.0045
1,2-Dibromoethane (EDB)	0.00033	0.0014
1,2-Dichlorobenzene	1.1	0.0009
1,2-Dichloroethane	0.0045	0.0011
1,2-Dichloropropane	0.12	0.0016
1,3-Dichlorobenzene	7.4	0.001
1,4-Dichlorobenzene	0.59	0.00087
2-Butanone (MEK)	4.5	0.0075
2-Methylnaphthalene	0.25	0.00222
Acenaphthene	16	0.000482
Acenaphthylene	13	0.000488
Anthracene	2.8	0.000829
Antimony	40	0.82
Arsenic	1.6	1.2
Barium	1500	0.21
Benzene	0.044	0.002
Benzo(a)anthracene	1.3	0.000876
Benzo(a)pyrene	0.13	0.000847
Benzo(b)fluoranthene	1.3	0.000718
Benzo(g,h,i)perylene	27	0.00105
Benzo(k)fluoranthene	1.3	0.000575
Beryllium	8	0.11
Bromodichloromethane	1.5	0.0013
Bromoform	1.7	0.00094

Analyte	Soil Screening Level (mg/kg)[1]	Laboratory Method Detection Limit (mg/kg)[2]
Bromomethane	0.28	0.005
Cadmium	12	0.16
Carbon tetrachloride	0.11	0.00046
Chlorobenzene	1.5	0.0012
Chloroethane	1.1	0.0022
Chloroform	2.4	0.0013
Chloromethane	20	0.0022
Chromium	2500	0.32
Chrysenes	13	0.0052
cis-1,2-Dichloroethene	0.19	0.003
cis-1,3-Dichloropropene	0.059	0.00034
Cobalt	80	0.11
Copper	230	0.3
Dibenz(a,h)anthracene	0.38	0.00119
Dibromochloromethane	6.6	0.0014
Ethylbenzene	3.3	0.0013
Fluoranthene	40	0.0022
Fluoranthenes/pyrenes	40	0.006778
Fluorene	8.9	0.000612
Fluorenes	8.9	0.002448
Hexachloro-1,3-butadiene	4.3	0.0031
Indeno(1,2,3-cd)pyrene	1.3	0.000932
Lead	320	0.51
Mercury	10	0.007
Methylene Chloride	0.077	0.004
Molybdenum	40	0.51
Motor Oil Range (C24-C36)	500	2.2
Naphthalene	1.2	0.00282
Naphthalenes	1.2	0.01128
Nickel	150	0.35
Phenanthrene	11	0.00539
Phenathrenes/anthracenes	2.8	0.027779
Pyrene	85	0.0024
Selenium	10	1.9
Silver	40	0.49
Styrene	1.5	0.00082
Tetrachloroethene	0.7	0.0023

Analyte	Soil Screening Level (mg/kg)[1]	Laboratory Method Detection Limit (mg/kg)[2]
Thallium	10	0.79
Toluene	2.9	0.0009
TPH-GRO	500	5.3
TPH-DRO[3]	500	4.8
TPH - Motor Oil	500	7
trans-1,2-Dichloroethene	0.67	0.0022
trans-1,3-Dichloropropene	0.059	0.00033
Trichloroethene	0.46	0.0019
Vanadium	200	0.38
Vinyl chloride	0.085	0.00073
Xylene (Total)	2.3	0.005
Zinc	600	1.9

[1] Screening levels established in the SFBRWQCB's Commercial/Industrial Land Use Tier 1 Environmental Screening Levels for Shallow Soil with Groundwater a Current Source of Drinking Water. A complete list of these screening levels is available online at http://www.waterboards.ca.gov/sanfranciscobay/water_issues/programs/esl.shtml.

[2] The maximum laboratory method detection limit is presented here.

[3] The 500 mg/kg TPH-DRO soil screening level was determined appropriate by the CCRWQCB and SBCEH for protection of human health in Sections 1-3.

15.0 FIELD QA/QC SAMPLES, REPORT PREPARATION, DOCUMENTATION, AND DATA VALIDATION

Field QA/QC samples, report preparation, documentation, and data validation will all be conducted per the *Confirmation Soil Sampling and Analysis Plan For Refugio incident – Pipeline Excavation Area* (approved by Unified Command [UC] on June 3, 2015.

16.0 REFERENCES

Department of Toxic Substances Control. Information Advisory Clean Imported Fill Material. October 2001. https://www.dtsc.ca.gov/Schools/upload/SMP_FS_Cleanfill-Schools.pdf

USEPA. Contract Laboratory Program National Functional Guidelines for Organic Data Review. EPA 540/R-99/008. October 1999. http://www.epa.gov/superfund/programs/clp/download/fgorg.pdf

USEPA. Guidance on Environmental Data Verification and Data Validation. EPA WA/G-8. November 2002.

http://www.epa.gov/quality/qs-docs/g8-final.pdf

USEPA. Guidance on Systematic Planning Using the Data Quality Objectives Process. EPA/240/B-06/001. February 2006. http://www.epa.gov/quality/qs-docs/g4-final.pdf

USEPA. Region III Fact Sheet Quality Control Tools: Blanks, revision 1, April 2009. http://www.epa.gov/region3/esc/qa/pdf/blanks.pdf

DTSC, 2001. Information Advisory Clean Imported Fill Material, https://www.dtsc.ca.gov/Schools/upload/SMP_FS_Cleanfill-Schools.pdf, October.

Attachment A

Maps

CTEH

Culvert Sections Overview

Refugio Incident

Project: 107292
Client: Plains All American
City: Gaviota, CA
County: Santa Barbara

PROJECTION SYSTEM: *Lambert Conformal Conic* DATUM: *North American 1983* No georeferenceable image available north side of pipeline. LAST UPDATED: *6/11/2015 2:45:25 PM*

CTEH

Culvert Section 1 Release Site

Refugio Incident

Project: 107292
Client: Plains All American
City: Gaviota, CA
County: Santa Barbara

PROJECTION SYSTEM: *Lambert Conformal Conic* DATUM: *North American 1983* No georeferenceable image available north side of pipeline. LAST UPDATED: *6/11/2015 1:14:17 PM*

CTEH

Culvert Section 2 Drainage Pipe

Refugio Incident

Project: 107292
Client: Plains All American
City: Gaviota, CA
County: Santa Barbara

PROJECTION SYSTEM: *Lambert Conformal Conic* DATUM: *North American 1983*

LAST UPDATED: *6/10/2015 10:17:12 AM*

CTEH

Culvert Section 3 Culvert

Refugio Incident

Project: 107292
Client: Plains All American
City: Gaviota, CA
County: Santa Barbara

PROJECTION SYSTEM: *Lambert Conformal Conic* DATUM: *North American 1983*

LAST UPDATED: *6/9/2015 6:27:29 PM*

Attachment B

Data Quality Objectives Worksheet

REFUGIO INCIDENT
DATA QUALITY OBJECTIVES
MATRIX: SOIL AND WATER
MATRIX: SOIL

STEP 1. DEFINE THE PROBLEM	
Petroleum contaminated soil may be present at the Refugio Incident release site (Section 1), areas where released oil could be present in Sections 2-4, or culverts area shown in maps (Area A-E) representing a threat to water quality, human health, wildlife (Section 4) and/or the environment.	
STEP 2. IDENTIFY THE DECISION OR GOAL OF SAMPLING/STUDY	
Soil samples will be collected as confirmation samples from excavated locations as outlined in this Addendum from Sections 1-4 to (1) characterize the chemical composition of the soil, (2) compare to the chemical of concern (COC) associated with the released crude oil (3) compare results to background sample results, since it is anticipated that concentrations of metals are naturally occurring at levels greater than established screening values (4) compare results to screening levels (Sections 1-3) discussed in Section 14 of this plan (5) make determinations on whether area can be backfilled with soil or further evaluation needs to be considered (6) develop risk based cleanup endpoints for Section 4.	
IDENTIFY THE ALTERNATIVE ACTIONS THAT MAY BE TAKEN BASED ON THE DECISIONS.	• If confirmation soil sampling results indicate results are "not detected" above method detection limits (MDLs), then it will be determined that 1) there are no COCs present, 2) no further sampling is required, 3) no further excavation of soil is required, and 4) backfilling can proceed. • If COCs in the confirmation soil samples are present at concentrations below UC approved screening values (see Section 14 of plan) or risk based cleanup endpoints derived for Section 4, then no 1) further sampling of the excavation is required, 2) no further excavation is required, 3) backfilling will proceed. • If COCs in the confirmation soil samples are present at concentrations above UC approved screening values (see Section 14 of plan) or risk based screening levels developed for Section 4, then no 1) additional excavation may be required if practical
STEP 3. IDENTIFY INPUTS NEEDED FOR THE DECISION	
IDENTIFY THE INFORMATIONAL INPUTS NEEDED TO RESOLVE A DECISION.	• Background sampling results • Results of excavation sampling • Backfill sampling results • Screening values (see Section 14) • Excavation of soil to be completed prior to sampling • Confirmation soil sampling results • Risk based cleanup endpoints developed for Section 4

IDENTIFY THE SOURCES FOR EACH INFORMATIONAL INPUT AND LIST THE INPUTS THAT ARE OBTAINED THROUGH ENVIRONMENTAL MEASUREMENTS.	**For Sections 1-3:** • Analytical results from Total Petroleum Hydrocarbons (TPH) as gasoline range organics (GRO) by EPA 8015 or 8260. • Volatile organic compounds (VOCs) following EPA Method 8260 or EPA 5035 • TPH for diesel range organics (DRO) and oil range organics (ORO) by EPA method 8015. No silica gel cleanup. • Polycyclic aromatic hydrocarbons (PAH) by using EPA Method 8270C SIM. • California Assessment Manual (CAM) 17 metals EPA method 6010/7471. • Background sampling results. • Backfill sampling results **For Section 4:** • All the above referenced methods. • Fractionated TPH for extractable petroleum hydrocarbons (EPH) and volatile petroleum hydrocarbons (VPH) by Massachusetts Department of Environmental Protection (MASS DEP EPH/VPH method) • Synthetic precipitation leaching procedures (SPLP) following analytical methods for VOCs, SVOCs, TPH, and metals by EPA 1312 • Background sampling results. • Backfill sampling results • Risk based cleanup endpoints
BASIS FOR THE CONTAMINANT SPECIFIC ACTION LEVELS.	Crude oil constituents, including metals, may naturally be present in soil. Therefore, soil samples will be collected from excavated soil in Sections 1-4 to determine if excavation activities were sufficient to remove Refugio Incident crude oil constituents in soil to 1) background concentrations as compared to background sampling results or 2) below site-specific screening levels (sections 1-3) (detailed in Section 14) and risk based cleanup endpoints for (Section 4).
IDENTIFY POTENTIAL SAMPLING TECHNIQUES AND APPROPRIATE ANALYTICAL METHODS.	• TPH-GRO by EPA 8260 or EPA 8015 • VOCs by EPA 8260 or EPA 5035 • TPH-DRO by EPA 8015 (No silica gel cleanup) • TPH-ORO by EPA 8015 (No silica gel cleanup) • PAHs by using EPA 8270C SIM • CAM 17 metals by EPA 6010 • TPH-EPH/VPH by MASS DEP EPH/VPH • SPLP for VOCs, SVOCs, TPH, and metals by EPA 1312
STEP 4: DEFINE THE BOUNDARIES OF THE STUDY	
DEFINE THE DOMAIN OR GEOGRAPHIC AREA WITHIN WHICH ALL DECISIONS MUST APPLY.	Excavated soil at sampling points within Sections 1-4 or background locations. Background samples will be collected in Section 4 from five locations located approximately 150 feet east and five locations located approximately 150 feet west of the impacted area along the Bluff and at least 50 feet from the UPRR tracks, with similar basic characteristics as the drainage path of the release. Refer to Attachment A for maps of Sections 1-4.
SPECIFY THE CHARACTERISTICS THAT DEFINE THE POPULATION OF INTEREST.	Results are representative of the area sampled in each Section.
DEFINE THE SCALE OF DECISION MAKING.	Results of confirmation soil samples will be used to determine if excavation activities were sufficient in removing crude oil constituents to 1) background sample results levels or 2) below applicable screening values (Sections 1-3), and cleanup endpoints (Section 4).

DETERMINE THE TIME FRAME TO WHICH THE DATA APPLY.	The data will apply until the soil represented by the samples receives appropriate response actions.
DETERMINE WHEN TO COLLECT DATA.	Samples will be collected upon approval of the Addendum, after excavation of soil at confirmation soil sampling locations have been completed.
IDENTIFY PRACTICAL CONSTRAINTS ON DATA COLLECTION.	• Inclement weather. • Access not attainable. • Equipment access issues. • Not safe to collect samples (consult Safety if alternate methods are available). • Must wait until excavation of area is complete to collect confirmation soil samples.
STEP 5. DEVELOP ANALYTICAL APPROACH/ DECISION RULE	
SPECIFY THE PARAMETER THAT CHARACTERIZES THE POPULATION OF INTEREST.	Detection of COCs in confirmation soil samples by analytical testing compared to laboratory established MDLs, then background concentrations, then to UC approved screening levels (Sections 1-3) (Section 14 of this plan), and then risk based cleanup endpoints developed for Section 4.
SPECIFY THE ACTION LEVEL FOR THE DECISION.	• If the COCs are detected below the laboratory established MDL, then COCs are not present in soil at that location. • If the COCs are detected at concentrations below background sampling results concentrations, then COCs presences do not pose an increased human-health or environmental risk and backfilling will begin. • If the COC are detected at concentrations above background sampling results, but below UC approved screening values (Sections 1-3), and cleanup endpoints (Section 4), then COCs presence does not pose an increased human-health or environmental risk and backfilling will begin. • If the COCs are detected at concentrations above the UC approved screening values (Sections 1-3), and cleanup endpoints (Section 4), then further excavation or remediation may take place.
STEP 6. SPECIFY PERFORMANCE OR ACCEPTANCE CRITERIA OR LIMITS ON DECISION ERRORS	
DEVELOP A DECISION RULE.	1. If COCs in the confirmation soil samples are present at concentrations below 1) background sample results or 2) applicable screening values(Sections 1-3), and cleanup endpoints (Section 4), then no further sampling of the excavation is required. Also, no further excavation is required and backfill with certified clean soil can be performed. 2. If sample results are greater than background soil sampling results, but less than UC approved screening values (Sections 1-3), and cleanup endpoints (Section 4), then no further excavation is required and backfill with certified clean soil can be performed. 3. If background sampling results are deemed valid by a third party validator and are at concentrations higher than UC agreed upon screening values (Sections 1-3), and cleanup endpoints (Section 4), then background sampling results become the new screening values. 4. If COCs in the confirmation soil samples higher than UC approved screening values (Sections 1-3), and cleanup endpoints (Section 4), then further actions may be required (excavation and/or remediation).

DETERMINE THE POSSIBLE RANGE OF THE PARAMETER OF INTEREST.	Contaminant concentrations may range from below the MDL for each specific constituent to more than the UC approved screening value.
DEFINE BOTH TYPES OF DECISION ERRORS AND IDENTIFY THE POTENTIAL CONSEQUENCES OF EACH.	Type I Error: Deciding that the specified area represented by the soil sample does not exceed the specified assessment level when, in truth, the waste soil concentration of the contaminant exceeds its screening levels (Sections 1-3), and cleanup endpoints (Section 4). The consequence of this decision error is that it may migrate to groundwater, possibly endangering human health, wildlife and the environment. This decision error is more severe. Type II Error: Deciding that the specified area represented by the soil sample does exceed the cleanup levels (Sections 1-3), and cleanup endpoints (Section 4), when, in truth, it does not. The consequences of this decision error are that engineering controls may be installed and unnecessary costs will be incurred.
DEFINE THE TRUE STATE OF NATURE FOR THE MORE SEVERE DECISION ERROR AS THE BASELINE CONDITION OR THE NULL HYPOTHESIS (H_o) AND DEFINE THE TRUE STATE FOR THE LESS SEVERE DECISION ERROR AS THE ALTERNATIVE HYPOTHESIS (H_a).	Ho: The soil represented by the sample is above the UC approved screening value (Sections 1-3), and cleanup endpoints (Section 4). Ha: The soil represented by the sample is below the UC approved screening value (Sections 1-3), and cleanup endpoints (Section 4).
ASSIGN THE TERMS "FALSE POSITIVE" AND "FALSE NEGATIVE" TO THE PROPER DECISION ERRORS.	• False Positive Error = Type I • False Negative Error = Type II
ASSIGN PROBABILITY VALUES TO POINTS ABOVE AND BELOW THE ACTION LEVEL THAT REFLECT THE ACCEPTABLE PROBABILITY FOR THE OCCURRENCES OF DECISION ERRORS.	Results of each sample will be considered to be representative of the location which the confirmation soil sample was collected.
STEP 7 OPTIMIZE THE DESIGN	
REVIEW THE DQOs.	Not applicable.
DEVELOP GENERAL SAMPLING AND ANALYSIS DESIGN. See SAP for details.	

REFUGIO INCIDENT
DATA QUALITY OBJECTIVES
MATRIX: WATER

STEP 1. DEFINE THE PROBLEM	
Petroleum contaminated water may be present in culverts or drainage ditches shown in maps (Features B-E) in operational Sections 1-4 representing a threat to water quality, human health, wildlife, and/or the environment. Mainly, when a rain event occurs, water sampling may be performed to minimize the impact of petroleum contaminated water to Sections 2-4 that can eventually impact the environment or beaches and shoreline if water reaches those areas.	
STEP 2. IDENTIFY THE DECISION OR GOAL OF SAMPLING/STUDY	
Water samples will be collected from culverts or ditches as outlined in this Addendum from Sections 2-4 to (1) characterize the chemical composition of the water, (2) compare to the chemical of concern (COC) associated with the released crude oil (3) compare results to flush tank water (as described in the plan) (4) determine if culverts or ditches need additional cleaning or flushing of water to remove COCs, while containing water to not impact the environment.	
IDENTIFY THE ALTERNATIVE ACTIONS THAT MAY BE TAKEN BASED ON THE DECISIONS.	• If COCs in the water samples are present at concentrations below applicable Public Health Group screening criteria, or baseline water samples, then no further actions are required. • If COCs in the water samples are present at concentrations above applicable Public Health Group screening criteria or baseline water samples, then further actions may be required.
STEP 3. IDENTIFY INPUTS NEEDED FOR THE DECISION	
IDENTIFY THE INFORMATIONAL INPUTS NEEDED TO RESOLVE A DECISION.	• Flush water sampling results • Compared results to applicable Public Health Group screening criteria or baseline samples. • Baseline sample result
IDENTIFY THE SOURCES FOR EACH INFORMATIONAL INPUT AND LIST THE INPUTS THAT ARE OBTAINED THROUGH ENVIRONMENTAL MEASUREMENTS.	• Analytical results from Total Petroleum Hydrocarbons (TPH) as gasoline range organics (GRO) by EPA 8015 or 8260. • Volatile organic compounds (VOCs) following EPA Method 8260. • TPH for diesel range organics (DRO) and oil range organics (ORO) by EPA method 8015. No silica gel cleanup • Polycyclic aromatic hydrocarbons (PAH) using EPA Method 8270C SIM. • California Assessment Manual (CAM) 17 metals EPA method 6010/7471. • Fractionated TPH for extractable petroleum hydrocarbons (EPH) and volatile petroleum hydrocarbons (VPH) by Massachusetts Department of Environmental Protection (MASS DEP EPH/VPH method) • Baseline sampling results.
BASIS FOR THE CONTAMINANT SPECIFIC ACTION LEVELS.	Water samples will be collected from the operational Sections 2-4 to determine absence or presence of crude oil constituents, determine if COCs are above or below baseline water sampling results, and then compare to applicable Public Health Group screening criteria to determine actions.

IDENTIFY POTENTIAL SAMPLING TECHNIQUES AND APPROPRIATE ANALYTICAL METHODS.	• TPH-GRO by EPA 8260 or EPA 8015 • VOCs by EPA 8260 • TPH-DRO by EPA 8015 (No silica gel cleanup) • TPH-ORO by EPA 8015 (No silica gel cleanup) • PAHs by using EPA 8270C SIM • CAM 17 metals by EPA 6010/7471 (field filtered) • TPH-EPH/VPH by MASS DEP EPH/VPH

STEP 4. DEFINE THE BOUNDARIES OF THE STUDY	
DEFINE THE DOMAIN OR GEOGRAPHIC AREA WITHIN WHICH ALL DECISIONS MUST APPLY.	See plan for specifics. In general, water samples will be collected from culverts or ditches starting with flush water and then collecting water at the end of the section, from A-B, B-C, C-D, and D-E.
SPECIFY THE CHARACTERISTICS THAT DEFINE THE POPULATION OF INTEREST.	Results are representative of the area sampled. See Section above.
DEFINE THE SCALE OF DECISION MAKING.	Results of water samples will be used to determine the absence or presence of COCs in water and compared against baseline water samples or applicable Public Health Group screening criteria. Results will be used to make determinations on any potential actions.
DETERMINE THE TIME FRAME TO WHICH THE DATA APPLY.	The data will apply until the water represented by the samples from A-B, B-C, C-D, and D-E receives appropriate response actions, if any are required.
DETERMINE WHEN TO COLLECT DATA.	Samples will be collected upon approval of the Addendum and at rain events until it is determined no further actions are needed by this UC approved plan.
IDENTIFY PRACTICAL CONSTRAINTS ON DATA COLLECTION.	• Inclement weather. • Access not attainable. • Not safe to collect sample. • Insufficient water volume to collect sample.
STEP 5. DEVELOP ANALYTICAL APPROACH/ DECISION RULE	
SPECIFY THE PARAMETER THAT CHARACTERIZES THE POPULATION OF INTEREST.	Detection of COCs in water samples to confirm the absence or presence of COCs to established MDLs, baseline water samples, and then Public Health Group screening criteria that may migrate to the environment.
SPECIFY THE ACTION LEVEL FOR THE DECISION.	• If the COCs are detected below the laboratory MDL, then COCs are not present in water at that location. • If the COCs are detected at concentrations below Public Health Group screening criteria or baseline water sampling results, then COCs presences do not pose an increased human-health or environmental risk and no further actions are taken. • If the COC are detected at concentrations above applicable Public Health Group screening criteria, then additional cleaning of culvers may be required.
STEP 6. SPECIFY PERFORMANCE OR ACCEPTANCE CRITERIA OR LIMITS ON DECISION ERRORS	
DEVELOP A DECISION RULE.	If COCs are not present, then a release to water has not been documented. If COCs are present in water, then a release to water has been documented. If sample results are lower than baseline or applicable Public Health Group screening criteria, then no further actions are required. If sample results are higher than higher than baseline or applicable Public Health Group screening criteria, then further actions may be required.
DETERMINE THE POSSIBLE RANGE OF THE PARAMETER OF INTEREST.	Contaminant concentrations may range from below the MDL for each specific constituent to more than the UC approved Public Health Group screening criteria.

DEFINE BOTH TYPES OF DECISION ERRORS AND IDENTIFY THE POTENTIAL CONSEQUENCES OF EACH.	Type I Error: Deciding that the specified area represented by the water sample does not exceed the specified assessment level when, in truth, the water concentration of the contaminant exceeds its specified Public Health Group screening criteria. The consequence of this decision error is that may migrate to groundwater or the Pacific ocean, possibly endangering human health, wildlife, and the environment. This decision error is more severe. Type II Error: Deciding that the specified area represented by the water sample does exceed the specified Public Health Group screening criteria when, in truth, it does not. The consequences of this decision error are that engineering controls may be installed, or further clean-up actions may happen, and unnecessary costs will be incurred.
DEFINE THE TRUE STATE OF NATURE FOR THE MORE SEVERE DECISION ERROR AS THE BASELINE CONDITION OR THE NULL HYPOTHESIS (H_o) AND DEFINE THE TRUE STATE FOR THE LESS SEVERE DECISION ERROR AS THE ALTERNATIVE HYPOTHESIS (H_a).	Ho: The water represented by the sample is above the UC approved Public Health Group screening criteria. Ha: The water represented by the sample is below the UC approved Public Health Group screening criteria.
ASSIGN THE TERMS "FALSE POSITIVE" AND "FALSE NEGATIVE" TO THE PROPER DECISION ERRORS.	• False Positive Error = Type I • False Negative Error = Type II
ASSIGN PROBABILITY VALUES TO POINTS ABOVE AND BELOW THE ACTION LEVEL THAT REFLECT THE ACCEPTABLE PROBABILITY FOR THE OCCURRENCES OF DECISION ERRORS.	To be assigned based on discussions with UC.
STEP 7. OPTIMIZE THE DESIGN	
REVIEW THE DQOs.	Not applicable.
DEVELOP GENERAL SAMPLING AND ANALYSIS DESIGN. See SAP for details.	

Name Signature Date

ADDENDUM TO CONFIRMATION SOIL SAMPLING AND ANALYSIS PLAN

FOR REFUGIO INCIDENT – PIPELINE EXCAVATION AREA

(ADDRESSES SECTIONS 1-4)

Approved by RP IC: _____ Date: 6/12/15

Approved by SBCoOEM IC: _____ Date: 6/12/15

Approved by State CAOFW IC: _____ Date: 6/12/15

Approved by USEPA IC: _____ Date: 6/12/15

Approved by USCG IC: _____, CAPT Date: 6/12/2015

Approved by Central Coast Water Board:

Digitally signed by Thea Tryon
DN: cn=Thea Tryon, o=Central Coast Water Board, ou=SCP LD, email=ttryon@waterboards.ca.gov, c=US
Date: 2015.06.12 10:51:16 -07'00'

Date: 6/12/2015

Approved by Santa Barbara County Public Health Department:

_____ Date: _____

ADDENDUM TO CONFIRMATION SOIL SAMPLING AND ANALYSIS PLAN

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_____ Date: _____

Approved by USCG IC:

_____ Date: _____

Approved by Central Coast Water Board:

_____ Date: _____

Approved by Santa Barbara County Public Health Department:

_____ Date: 6/12/2015

Boggs, Melissa@Wildlife

From: McCaw, Paul <Paul.McCaw@sbcphd.org>
Sent: Friday, June 12, 2015 11:53 AM
To: Boggs, Melissa@Wildlife
Cc: Imai, Randy@Wildlife; Yamamoto, Julie@Wildlife; Connell, Michael@Wildlife; tre.wharton@c-ka.com; Kyle Lawrence (klawrence@cteh.com); Klein-Rothschild, Susan; Wada, Takashi; Fay, Lawrence; Tryon, Thea@Waterboards
Subject: RE: Refugion - Attached is addendum to confirmation soil sampling and analysis plan for final review/signautre please
Attachments: Addendum to SAP Signature Page_2015-06-05.pdf

Hi Melissa,

Attached is signature page for SAP Addendum.

Best Regards,
Paul

Paul McCaw
Hazardous Materials Supervisor
LUFT/Site Mitigation Unit Programs
Hazardous Materials Unit
Santa Barbara County Public Health Department
Environmental Health Services Division
2125 South Centerpointe Parkway, Room 333
Santa Maria, California 93455
Ph: (805) 346-8359
FAX: (805) 346-8485
paul.mccaw@sbcphd.org
http://www.countyofsb.org/phd/

From: Boggs, Melissa@Wildlife [mailto:Melissa.Boggs@wildlife.ca.gov]
Sent: Friday, June 12, 2015 10:45 AM
To: Tryon, Thea@Waterboards; McCaw, Paul
Cc: Imai, Randy@Wildlife; Yamamoto, Julie@Wildlife; Connell, Michael@Wildlife; tre.wharton@c-ka.com; Kyle Lawrence (klawrence@cteh.com)
Subject: Refugion - Attached is addendum to confirmation soil sampling and analysis plan for final review/signautre please

Hello Thea and Paul;

I am back at command post as Env Unit Leader (Mike Connell left yesterday) and we just got out of a Unified Command mtg and Kyle Lawrence and Tre Wharton, Plains consultants, presented a summary of the attached addendum to confirmation soil sampling and analysis plan for the pipeline excavation area...I understand you have both verbally approved of edits discussed yesterday but UC would like to get your agencies to formally sign off on the attached so we added signature lines for you on the cover page – ideally the UC wants to approve this today so if possible can you

review/approve by 1:00 ish today so we can get to UC today for approval? Please let us know if this cannot be accommodated.

Thanks very much for your help!

Melissa Boggs
Senior Environmental Scientist (Supervisor)
California Department of Fish and Wildlife, Office of Spill Prevention and Response
3196 South Higuera Street, Suite A
San Luis Obispo, CA 93401
Office: 805-594-6165
Cell: 805-558-1005

Wildlife.ca.gov
Wildlife.ca.gov/OSPR

Boggs, Melissa@Wildlife

From: Tryon, Thea@Waterboards
Sent: Friday, June 12, 2015 10:55 AM
To: Boggs, Melissa@Wildlife; paul.mcCaw@sbcphd.org
Cc: Imai, Randy@Wildlife; Yamamoto, Julie@Wildlife; Connell, Michael@Wildlife; tre.wharton@c-ka.com; Kyle Lawrence (klawrence@cteh.com)
Subject: RE: Refugion - Attached is addendum to confirmation soil sampling and analysis plan for final review/signautre please
Attachments: 20150612 Addendum Confirmation Soil Sampling and Analysis Plan _Sections 1 through 4_FINAL.pdf

Importance: High

Hi Melissa,

Yes, you are correct. We have been involved with the editing.

I signed electronically. Hope that is OK.

Thea Tryon, P.G.
Senior Engineering Geologist
Central Coast Water Board
Site Cleanup Program Manager and
Enforcement Coordinator
895 Aerovista Place, Suite 101
San Luis Obispo, CA
Tel. (805) 542-4776
Fax (805) 543-0397

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Thanks very much for your help!

Melissa Boggs

ADDENDUM TO CONFIRMATION SOIL SAMPLING AND ANALYSIS PLAN

FOR REFUGIO INCIDENT – PIPELINE EXCAVATION AREA

(ADDRESSES SECTIONS 1-4)

Approved by RP IC:

_____ Date: _____

Approved by SBCoOEM IC:

_____ Date: _____

Approved by State CAOFW IC:

_____ Date: _____

Approved by USEPA IC:

_____ Date: _____

Approved by USCG IC:

_____ Date: _____

Approved by Central Coast Water Board:

_____ Date: _____

Approved by Santa Barbara County Public Health Department:

_____ Date: _____

Table of Contents

LIST OF TABLES

LIST OF ATTACHMENT

1.0 INTRODUCTION

The *Confirmation Soil Sampling and Analysis Plan For Refugio incident – Pipeline Excavation Area* (approved by Unified Command [UC] on June 3, 2015) was prepared on behalf of the Environmental Unit supporting UC, to present the high level rationale and basis for the collection of confirmation samples associated with the crude oil release on Line 901, Mile Post 4 near Santa Barbara, California, in accordance with Order 2015-01-FPNA15017. The areas in Section 1 addressed by the June 3, 2015, plan includes:

- The base and along the north, east, and south sidewalls of the pipeline repair excavation;

Whereas this Addendum includes remaining areas within Section 1 which include:

- west end of the pipeline repair excavation
- the Berm on the south end of Section 1
- the area that has been excavated where oil pooled against the berm south of the pipeline.

This Addendum also addresses Sections 2-4 (drainage pipe to the top edge of the Cliff Face). Refer to Attachment A for maps.

2.0 DESCRIPTIONS OF SECTIONS 1-4

A description of each Section is provided in the subsections below.

2.1 SECTION 1 - RELEASE SITE (EXCAVATION AREA AND INLET DRAINAGE)

Section 1 is located on the north side of California Highway 101 (Hwy 101) within the property boundaries of assessor parcel number (APN) 081-210-047. Visually impacted soil remains at the west end of the pipeline repair excavation, as well as in the Berm located adjacent and south of the pipeline repair excavation. Excavation efforts to remove impacted material directly adjacent to the pipeline cannot begin until the pipeline has been stabilized with backfill material. All soil confirmation sampling locations included in this addendum of Section 1 will be in reference to the west end of the pipeline repair excavation, areas outside the pipeline repair excavation area, including the Berm, and the inlet to the drainage conduit. All other sampling requirements for the pipeline excavation are per the *Confirmation Soil Sampling and Analysis Plan For Refugio incident – Pipeline Excavation Area (approved by Unified Command [UC] on June 3, 2015).*

The inlet of the drainage conduit is located adjacent to the west end of the pipeline repair excavation and approximately 200 feet north of the Hwy 101 north right-of-way (see Attachment A – Feature A).

2.2 SECTION 2 - DRAINAGE PIPE

Section 2 includes the drainage conduit termination point as well as a concrete drainage collection area (see Attachment A – Feature B). The concrete drainage collection area is comprised of three separate concrete swales, as well as the inlet for the drainage pipe that runs under Hwy 101.

The drainage pipe that runs under Hwy 101 north and south measures approximately 250 linear feet from the inlet on the north side of the Hwy 101 north right-of-way to the termination point located on the south side of Hwy 101 (see Attachment A – Feature B). A drainage drop inlet is located in the median of Hwy 101, adjacent to the north side of the Hwy 101 south right-of-way (see Attachment A – Feature C). The termination point of the drainage pipe is located approximately 6 feet from the culvert inlet that runs under the Union Pacific Railroad (UPRR) track.

2.3 SECTION 3 – UPRR CULVERT

Section 3 includes the drainage pipe termination point and the inlet for the culvert pipe that runs under the UPRR track. The culvert measures approximately 20 linear feet from the inlet on the north of the tracks to the termination point on the south of the tracks (see Attachment A- Feature D).

2.4 SECTION 4 – BLUFF

The Bluff area extends from the southern termination point of the culvert that runs under the UPRR track (Attachment A- Feature E) to the approximate edge of the Cliff Face (see Attachment A). The Bluff area impacted by the release is generally longer than it is wide as it follows the path of historical drainage. Although the historic drainage path meanders, the approximate length of the impacted area is approximately 200 feet. The width of the impacted area varies towards the Cliff. Several constraints exist within Section 4 as established by the June 6, 2015, UC approved plan, *Constraints Assessment Team (CAT) Activities Related to Cleaning of Cliff Faces and Contiguous Rocky Prominences*.

3.0 SAFETY AND CONSTRAINTS

All sampling and excavation/removal of visually-impacted media will be conducted in accordance with the UC approved *Refugio Incident Site Safety and Health Plan*. All sampling and excavation/removal of visually-impacted media will only occur if it can be reasonably and safely done. All sampling and removal activities will be approved by a safety officer prior to commencing.

All sampling and excavation/removal of visually-impacted media will be conducted in accordance with the UC approved plan, *Constraints Assessment Team (CAT) Activities Related to Cleaning of Cliff Faces and Contiguous Rocky Prominences*.

4.0 SAMPLING OBJECTIVES

The objective of this Addendum is as follows:

- Establish confirmation sampling methodology, sample frequency, and analytical methods for Sections 1 through 4.
- Establish risk-based cleanup goals, background and clean backfill soil sampling methodology, sample frequency, and analytical methods for Section 4.

The objective of the sampling under this Addendum is as follows:

- Confirm chemicals of concern (COCs) associated with the Refugio Incident are no longer present. The goal is to remove as much impacted soil as practical to restore conditions to background. If background conditions cannot be achieved, UC approved endpoints (see section 14) will apply to Sections 1 through 3 and risk-based cleanup endpoints will apply to Section 4.

5.0 DATA QUALITY OBJECTIVES

This Section on Data Quality Objectives (DQOs) presents the intended data usage and QA objectives for the sampling and analysis that will be performed for this Addendum. In general, the purpose of the DQOs are to establish a target level that can be measured against whether data collected are of appropriate quality to produce documented, consistent, and technically defensible data. DQOs have been generated for the soil and water matrix following EPA Guidance on Systematic Planning using the Data Quality Objectives Process (QA/G-4 2006), and a worksheet listing the DQOs are attached to this Addendum (see Attachment B).

6.0 SOIL AND WATER SAMPLING AND METHODOLOGY

A strategic planning approach based on scientific methodology will be employed for data collection activities providing a systematic procedure to ensure the type, quantity, and quality of data used in decision-making will be appropriate for the intended soil confirmation sampling. General soil and water sampling methodologies will be used for all soil and water sampling activities as described in Section 6.1. Section-specific soil and water

confirmation plans have been developed for each of the Sections (1 through 4) and are based on the existing conditions and features in each of the individual Sections (see Sections 7-10).

6.1 SAMPLING METHODOLOGY

Soil samples may be collected utilizing a slide hammer equipped with a stainless steel core barrel sampler containing a 6-inch stainless steel sleeve. The sampler will be manually driven into the soil at the desired depth. Teflon® tape will be placed at each open end of the sampling sleeve, and plastic end caps will be affixed over the Teflon® tape. In the likely event of refusal due to gravels and cobbles or the samples are not cohesive enough to be retained in the sampling sleeve, a decontaminated stainless steel spoon or trowel will be used. A decontaminated pick or shovel may also be necessary. Samples obtained by using a spoon or trowel will be collected into clean, laboratory-provided glass jars. Per the landowner's request, 50% of samples collected from Section 1 will be collected in a manner consistent with Environmental Protection Agency (EPA) Method 5035 for volatile organic compounds (VOCs) and total petroleum hydrocarbons (TPH) – gasoline range organics (GRO). A total of 20% of samples collected in Sections 2-4 will be collected in a manner consistent with EPA Method 5035 for VOCs and TPH – GRO. In Section 4 every effort will be made to collect intact samples using a slide hammer. At least 20% of samples for VOCs and GRO will be collected using EPA Method 5035.

Soils for the composite samples will be five point composite samples and each aliquot will be placed into decontaminated stainless steel bowls and homogenized prior to filling glass containers. Samples for VOC analysis will be filled directly from the boring with no homogenization.

Each laboratory supplied sample container will be completely filled to minimize headspace. Vegetation, rocks, litter, and other non-native soil material will be carefully removed prior to filling sample containers, when practical to do so.

Prior to confirmation sampling, an environmental representative will visually assess the area. Additional excavation may be required to remove visually impacted media prior to confirmation sampling. Soil samples will be field screened for VOCs utilizing a hand-held photo-ionization detector (PID). Additional soil samples may be collected based on field observations. Samples will be collected by an experienced field scientist. Information recorded will include soil type and description, color, and moisture content. Pertinent information concerning the occurrence of impacted material (e.g., odors, staining, PID readings) will also be documented.

Field teams, composed of CTEH® personnel, will be deployed with appropriate equipment and supplies to collect flush water samples. All sampling will be documented in field notebooks, CTEH® field forms, or hand-held devices (including photos).

Water samples will be decanted directly into laboratory supplied sample containers and submitted to Pace Analytical (Pace).

6.2 ANALYTICAL METHODS

Soil and water samples will be analyzed under rapid turnaround (typically within 24-hrs) time. In general, soil and/or water samples in Sections 1 - 3 will be sampled for the following:

- Total Petroleum Hydrocarbons using Modified EPA Method 8015 (or 8260 for GRO)
- VOCs using EPA Method 8260
- PAHs using EPA Method 8270C SIM, and
- CAM 17 metals using EPA Method 6010/7471

At the request of the Central Coast Regional Water Quality Control Board (CCRWQCB), soil/water samples collected from Section 4 will also be submitted for analyses of:

- Mass EPH/VPH (Extractable Petroleum Hydrocarbons/Volatile Petroleum Hydrocarbons) using fractionation methods per the Massachusetts Department of Environmental Protection (May 2004); and
- Synthetic Precipitation Leaching Procedure (SPLP) using EPA Method 1312 for VOCs, SVOCs, TPH and metals analysis listed above. Up to four samples will be analyzed using SPLP. The samples with the highest total concentration for VOCs, SVOCs, TPH and metals will be selected for SPLP analysis.

Analytical testing will be performed according to the methods outlined above which include analysis previously approved in the *Quality Assurance Project Plan*, as well as additional analysis requested by the CCRWQCB and Santa Barbara County Environmental Health Services (SBCEHS). This project will follow well-recognized analytical methods for all samples analyzed by National Environmental Laboratory Accreditation Program (NELAP) certified labs. Samples will be sent to Pace Analytical Services, Inc. (PACE).

Analysis, analytical methods, sample containers details, preservation, and holding times are detailed in Table 1 and 2.